

However, although this method provides a simple means of reducing the number of bits representing each pixel from sixteen to nine, the quality of the resulting image is noticeably affected, as bits that determine a pixel's colour are discarded. Although the poor image quality is partly due to the number of colours available for displaying the image being reduced from 65,536 to 512, the deterioration of the image is increased due to data being discarded and lost for each colour component during truncation. In particular, such image deterioration causes significant visible contouring of the image, which is undesirable to a user viewing the display.

Thus, a need exists for an improved image processing mechanism for a display, wherein the abovementioned disadvantages may be alleviated.

#### **Statement of Invention**

In accordance with a first aspect of the present invention, there is provided a method for processing image or video data for a display, as claimed in Claim 1.

In accordance with a second aspect of the present invention, there is provided an image or video processing system, as claimed in Claim 11.

In accordance with a third aspect of the present invention, there is provided a display driver for refreshing an image of a display device, as claimed in Claim 12.

In accordance with a fourth aspect of the present invention, there is provided a storage medium storing processor-implementable instructions for controlling one or more processors, as claimed in Claim 13.

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In accordance with a fifth aspect of the present invention, there is provided an image or video communication device having a display, as claimed in Claim 14.

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In accordance with a sixth aspect of the present invention, there is provided a video or image communication device, as claimed in Claim 15.

15 Further aspects of the present invention are as defined in the dependent Claims.

In summary, an image communication device and method for processing image or video data for a display are  
20 described whereby a bit truncation process is improved by reusing discarded bits to improve the quality of the image generated from non-discarded bits. The improvement is achieved by using the discarded bits to modify the bit values of the non-discarded bits of pixels or blocks of  
25 pixels.

### **Brief Description of the Drawings**

Exemplary embodiments of the present invention will now  
30 be described, by way of example only, with reference to the accompanying drawings, in which:

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**Claims**

1. A method (900) for processing image or video data for a display, the method comprising the step of:  
5 separating (905, 925) a stream of image or video data into a block of pixels, wherein each pixel within the block of pixels comprises a first sequence of pixel bit values for a colour component of said image or video and one or more bits to be discarded (730);  
10 the method characterised by the steps of:  
determining (950, 960), for the block of pixels, a binary value of said one or more bits to be discarded (730) to derive an offset for said respective colour component; and  
15 modifying (955, 965) said first sequence of pixel bit values as a block of pixels in response to said determined binary value to form a reduced number of pixel bit values to represent said colour component of a pixel within the block of pixels, wherein said offset is used  
20 to determine the number of pixels within the block that are to be modified.
2. The method (900) for processing image or video data for a display according to Claim 1, the method  
25 further characterised by the step of:  
determining an average colour component for one or more colours of said block of pixels (930), wherein a number of said first sequence of pixel bit values represents a number of respective baseline colour  
30 component values of a pixel (935).
3. The method (900) for processing image or video data for a display according to Claim 2, wherein the step

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of determining an average colour component (930) includes the step of:

adding a number of colour components from a block of pixel data from said stream of image or video data to form a colour component pixel value; and

dividing said colour component pixel value by the number of pixels to provide an average colour component value.

4. The method (900) for processing image or video data for a display according to Claim 2 or Claim 3, the method further characterised by the step of:

truncating said average colour component value (920) by discarding one or more lesser significant bits (950, 960) to obtain a reduced number of bits forming said first sequence of pixel bit values for pixels within a block.

5. The method (900) for processing image or video data for a display according to Claim 1, wherein the step of modifying (955, 965) includes modifying a bit of higher significance within said first sequence of pixel bit values with one or more discarded (730) bits of lesser significance.

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6. The method (900) for processing image or video data for a display according to Claim 1, the method further characterised by the step of:

dividing the offset value by a multiple of the number of bits to be discarded (730) to indicate the number of pixels within the block for which a correction value is to be added to the baseline value of that colour component.

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7. The method (900) for processing image or video data for a display according to Claim 1, the method further characterised by the step of:

5 omitting said step of modifying when said first sequence of pixel bit values comprises a series of binary '1's, to avoid a bit-rollover when modifying said first sequence of pixel bit values.

10 8. The method (900) for processing image or video data for a display according to Claim 1, the method further characterised by the steps of:

determining a level of image detail in an image area of said stream of image or video data; and

15 applying said steps of determining a binary value of said one or more bits to be discarded (730) and modifying said first sequence of pixel bit values in response to determining a low level of image detail.

20 9. The method (900) for processing image or video data for a display according to Claim 8, wherein said step of determining a level of image detail includes determining a luminance value (910) for a number of pixels within a block of pixels, such that if the

25 luminance value is below a threshold (915) then the block of pixels are determined as residing within a low level of image detail.

10. An image or video processing system, adapted to  
30 perform the method steps of any of Claims 1 to 9.

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11. A display driver (111) for refreshing an image of a display device, wherein the display driver (111) is adapted to perform the method steps of Claim 1.
- 5 12. A storage medium storing processor-implementable instructions for controlling one or more processors to carry out the method of Claim 1.
13. An image or video communication device (100) having a display (110) adapted to perform the method steps of Claim 1.
- 10 14. A image or video communication device (100), the device comprising:
- 15 a display (110) for displaying an image;  
a processor (108), operably coupled to said display (110), for processing said image to be displayed wherein said processor is configured to separate a stream of image or video data into a block of pixels, wherein
- 20 each pixel within the block of pixels comprises a first sequence of pixel bit values for a colour component of said image or video and one or more bits to be discarded (730), characterised in that the processor (108) determines a binary value of said one or more bits to be
- 25 discarded (730) to derive an offset to said respective colour component for the block of pixels, and modifies as a block of pixels said first sequence of pixel bit values based on the binary value to form a reduced number of bit values that represent said colour component of a pixel
- 30 within the block of pixels, wherein said offset is used to determine the number of pixels within the block that are to be modified.

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15. The image or video communication device (100) according to Claim 13 or Claim 14, wherein the image or video communication device (100) device is one of:
- 5 a cellular phone, a portable or mobile radio, a personal digital assistant, a laptop computer, a wirelessly networked PC.